

Unit 2 Topic Practice Questions Pg 29-30

$$1. \frac{1.8 \times 10^{22} \text{ molecules}}{6.022 \times 10^{23} \text{ molec}^{-1}} = 0.030 \text{ mol O}_2$$

(B)



(D)

$$3. \frac{3.0 \text{ dm}^3 \text{ SO}_2}{2 \text{ dm}^3 \text{ SO}_2} = 3.0 \text{ dm}^3 \text{ SO}_3$$

$$\frac{2.0 \text{ dm}^3 \text{ O}_2}{1 \text{ dm}^3 \text{ O}_2} = 4.0 \text{ dm}^3 \text{ SO}_3$$

(C)

$$4. \frac{10.0 \text{ g CaCO}_3}{100.09 \text{ g}} \times \frac{2 \text{ mol HCl}}{1 \text{ mol CaCO}_3} \times \frac{\text{dm}^3}{0.500 \text{ mol HCl}} = 0.400 \text{ dm}^3$$

(D)

$$5. \frac{20.3 \text{ g Al} \mid 1 \text{ mol Al}}{26.92 \text{ g}} = \frac{0.7541 \text{ mol}}{0.7541} = 1$$

$$\text{AlCl}_3 = 133 \text{ g/mol}$$

$$\frac{79.7 \text{ g Cl} \mid 1 \text{ mol Cl}}{35.45 \text{ g}} = \frac{2.248 \text{ mol}}{0.7541} = 3$$

$$\frac{267}{133} = 2 \quad \boxed{\text{Al}_2\text{Cl}_6}$$



$$\text{b) } \frac{0.1000 \text{ mol HCl} \mid 0.04880 \text{ dm}^3 \mid 1 \text{ mol Na}_2\text{CO}_3}{\text{dm}^3 \mid 2 \text{ mol HCl} \mid 0.025 \text{ dm}^3} = 0.09760 \text{ mol dm}^{-3}$$

$$\text{c) } \frac{0.09760 \text{ mol} \mid 105.99 \text{ g}}{\text{dm}^3 \mid 1 \text{ mol}} = \frac{10.34 \text{ g}}{\text{dm}^3}$$

$$d) 27.82g - 10.34g = 17.48g H_2O$$

$$\frac{10.34g Na_2CO_3}{105.99g} \times \frac{1mol}{1mol} = 0.09756$$

$$\frac{17.48g H_2O}{18.02g} \times \frac{1mol H_2O}{1mol H_2O} = 0.9700mol$$



7) a) Ice changes to water at the same rate as water changes to ice

b) heat is given off by the skin & absorbed by the liquid to give enough energy to change it from a liquid to a gas

$$8) a) \frac{85.6 \text{ g C}}{12.01 \text{ g}} \times \frac{1 \text{ mol C}}{1} = \frac{7.127 \text{ mol}}{7.127} = 1$$

$$\frac{14.4 \text{ g H}}{1.01 \text{ g}} \times \frac{1 \text{ mol H}}{1} = \frac{14.26 \text{ mol}}{7.127} = 2 \quad \text{CH}_2$$

$$b) M_r = \frac{gRT}{PV} = \frac{100 \text{ g} \times 8.31 \text{ kg m}^2 \text{ s}^{-2} \text{ mol}^{-1} \text{ K}^{-1} \times 273 \text{ K}}{1.01 \times 10^5 \text{ kg} \times 0.399 \text{ dm}^3}$$

typo
book says
100g!

$$\frac{1 \text{ dm}^3}{10^{-3} \text{ m}^3} = 56.39 \text{ g/mol}$$

$$ii) \text{CH}_2 = 14 \text{ g/mol}$$

$$\frac{56}{14} = 4$$



9. a) the molecules of a gas are in constant motion & will expand to fill the room

b) increasing temp increasing the kinetic energy of the molecules so the molecules will move faster & fill the room more rapidly